REMARKS

Claims 1 and 2 have been amended to incorporate therein the recitation of claim 4.

Claim 4 has been canceled.

Entry of the Amendments and review and reconsideration on the merits are requested.

Response to Rejection over Saito et al

Claims 1, 4-12, 18, 20 and 22 were rejected under 35 U.S.C. § 102(b) as anticipated by

or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent 6,716,942 to Saito et

al.

Applicants respectfully traverse for the following reasons.

(1)   The fluoropolymer producing method of claim 1 comprises polymerizing a radical

polymerizable monomer in a manner of continuous polymerization in a defined reaction-field to

give the fluoropolymer avoiding the use of carbon dioxide, wherein the defined reaction-field is

in a supercriticality-expression state and under a pressure of not higher than 40 MPa and a

temperature of not higher than that higher by 100°C than the supercriticality-expression

temperature of the defined reaction-field, <u>having a ratio $[\rho_m/\rho_0]$ of not lower than 1.1, where ρ_m</u>

<u>is a monomer density and ρ_0 is a monomer critical density,</u> wherein the supercriticality-

expression state is formed in one-component systems in which one kind of a radical

polymerizable monomer exists, or in multicomponent systems in which two or more kinds of

radical polymerizable monomers exist, the radical polymerizable monomer comprises a fluorine-

containing ethylenic monomer, the fluoropolymer has a weight average molecular weight [Mw]

of not lower than 150,000 as determined on the polystyrene equivalent basis, and a ratio

[Mw/Mn] of the weight average molecular weight [Mw] on the polystyrene equivalent basis to a

number average molecular weight [Mn] of the fluoropolymer on the polystyrene equivalent basis

is higher than 1 but not higher than 3.

(2)   Because the defined reaction-field has a ratio $[\rho_m/\rho_0]$ limited to the claimed range,

the method of the present invention can provide a high polymerization rate and excellent

productivity in continuous polymerization. Furthermore, the defined reaction-field having the

claimed ratio $[\rho_m/\rho_0]$ can yield polymers having a high molecular weight, a unimodal molecular

weight distribution and a ratio [Mw/Mn] with the claimed range (page 13, line 31 - page 14, line

6 of the specification). Such excellent effects of the present invention are shown in Examples 1-

5 and Figures 1, 2 and 5-7 of the present application. Although the reason as to why the defined

reaction-field as claimed shows such excellent effects is not apparent, Applicants consider that

the polymerization preferentially proceeds within the forming fluoropolymer particles rather than

in other parts of the reaction field when the ratio $[\rho_m/\rho_0]$ is limited to within the claimed range

(page 12, lines 18 - page 13, line 19 of the specification).

(3)   In view of the substantially identical polymerization reaction field disclosed by

Saito et al and by the present Applicants, the Examiner was of the view that the supercriticality-

expression state of Saito et al would *inherently* possess the capability of producing a reaction-

field having the ratio $[\rho_m/\rho_0]$ of not lower than 1.1 as claimed.

However, the reaction-field of Saito et al does not fall within the claimed range.

In the Examples 1-3 of Saito et al, the weights of HFP and VDF are respectively 114.2g

and 40.2g, and the volume of the autoclave is 548 ml. From these values, the ρ_m value of the

Examples of Saito et al is calculated to be 0.281 g/ml (=114.2/548 + 40.2/548) based on the

procedure of the present specification, at page 14, lines 17-31. Since the ρ_0 values of HFP and

VDF are respectively 0.559 g/ml and 0.43 g/ml, the ρ_0 value of those is calculated to be 0.500 g/ml ($=\rho_0$ HFP x X_0, HFP $+ \rho_0$, VDF x X_0, VDF $= 0.559$ g/ml x 0.548 + 0.43 g/ml x 0.452; X is the mole fraction of the reaction field) based on the procedure as mentioned above. Therefore, the ratio [ρ_m/ρ_0] in the Examples of Saito et al is 0.563, well outside the ratio [ρ_m/ρ_0] of <u>not lower than 1.1</u> as required by amended claim 1.

Consequently, it is respectfully submitted that amended claim 1 defines novel subject matter.

(4)   Since the polymerization is carried out in the defined reaction-field having the ratio [ρ_m/ρ_0] limited to the claimed range, the present invention shows excellent effects on the rate of polymerization, productivity, or the molecular weight or the molecular weight distribution of the products, as discussed above. On the other hand, Saito et al do not mention or teach such a reaction-field as claimed, still less the effects based on the reaction-field. Namely, there is no apparent reason which would lead one skilled in the art to modify the reaction-field of Saito et al to have a ratio [ρ_m/ρ_0] of not lower than 1.1 as required by amended claim 1.

Therefore, it is respectfully submitted that amended claim 1 and claims 5-12, 18, 20 and 22 depending therefrom are patentable over Saito et al, and withdrawal of the foregoing rejection is respectfully requested.

Response to Rejection over U.S. Patent 6,716,945 to DeSimone et al

Claims 2, 3, 13-17, 19, 21 and 23 were rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent 6,716,945 to DeSimone et al.

In response, claim 2 has been amended to incorporate therein the limitation of claim 4 (not rejected over DeSimone et al), to thereby obviate the foregoing rejection.

Applicants further comment as follows.

The polymerization of DeSimone et al yields polymers having a multimodal molecular distribution, not a polymer having a unimodal molecular distribution as provided by the present invention. Moreover, the reaction-field of DeSimone et al does not fall within the claimed range.

From the data of Table 2, ρ_m and ρ_m/ρ_0 values of Run A, which are the smallest of Runs, are respectively calculated to be 0.0723 g/ml (=1.13 [mol/l] x 64 [g/mol]/1000 [ml/l]) and 0.168 based on the procedure as described above. Those values of Run F, which are the largest of Runs, are respectively calculated to be 0.225 g/ml (=3.53 [mol/l] x 64 [g/mol]/1000 [ml/l]) and 0.525 by the procedure as Run A.

Thus, the polymerization and products of DeSimone et al are quite different from those of the present invention.

Withdrawal of all rejections and allowance of claims 1-3 and 5-23 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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